embodiments illustrated in the drawing.

Fig. 1 shows the amplitude frequency response of a prototype filter;

Fig. 2 shows the amplitude frequency response called forth by the interference of three subchannels;

Fig. 3 shows an equivalent circuit of an Inverse Discrete Fourier Transform;

Fig. 4 shows the amplitude frequency response of a prototype filter;

Fig. 5 shows the phase frequency response of a prototype filter;

Fig. 6 shows the amplitude of the transmission functions of three subcarriers;

Fig. 7 shows the phase response of the transmission functions of three subcarriers;

Fig. 8 shows the overlapping and standardized side lobes of a prototype filter for M=16;

Fig. 9 shows the amount frequency response with a fade-out range;

Figs. 10a and 1b each show a schematic representation of a fade-out range;

Fig. 11 shows a block diagram of the transmitter of an embodiment of the transmission system according to the invention;

Fig. 12 shows a block diagram of the transmitter of another embodiment of the transmission system according to the invention;

Fig. 13 shows the amplitude frequency response of transmission functions with a fade-out range;

Fig. 14 shows the amplitude of the nominal transmission functions for a compensation pulse;

Fig. 15 shows a schematic representation of the transmitter signal when using a cyclical prefix;

Fig. 16 and Fig. 17 show amplitude frequency and phase frequency response of the transmission functions of subcarriers;

Fig. 18 shows a schematic representation of the vectors g(n);

Fig. 19 shows the nominal transmission function and two compensation pulses of various length;

Fig. 20 shows a schematic representation of v(n);

Fig. 21 shows a power density spectrum for transmission with M=512 subchannels;

Fig. 22 to 24 show enlarged portions of the fade-out ranges of Fig. 21;

Fig. 25 shows power density spectrum for transmission with M=1024 subchannels;

Fig. 26 to 28 show enlarged portions of the fade-out ranges of Fig. 25;

Fig. 29 shows power density spectrum for transmission with M=2048 subchannels;

Fig. 30 to 32 show enlarged portions of the fade-out ranges of Fig. 21;

Fig. 33 shows a block diagram of a transmission system for carrying out an embodiment of the method according to the invention;

Fig. 34 shows a chart with the zero charged subcarriers used for a conventional method of transmission,

Fig. 35 shows a diagram of the power density spectrum for a method of transmission according to Fig. 34;

Fig. 36 shows details of the diagram according to Fig. 35;

Fig. 37 shows a chart with the zero charged subcarriers used for an embodiment of the method according to the invention;

Fig. 38 shows a diagram of the power density spectrum for a method of transmission according to Fig. 37;

Fig. 39 shows details of the diagram according to Fig. 38;

Fig. 40 shows a chart with the zero charged subcarriers used for an embodiment of the method according to the invention;

Fig. 41 shows a diagram of the power density spectrum for a transmission method according to Fig. 40;

Fig. 42 shows details of the diagram according to Fig. 41;

Fig. 43 shows a chart with the zero charged subcarriers used for an embodiment of the method according to the invention;

Fig. 44 shows a diagram of the power density spectrum for a method of transmission according to Fig. 43 and

Fig. 45 shows details of the diagram according to Fig. 44.

In transmission systems based on frequency-division multiplexing that have become known under the designations multiple carrier method, Orthogonal Frequency Division Multiplexing (OFDM) and Discrete Multitone (DMT), a broad frequency band is subdivided into a plurality of very narrow frequency bands or subchannels which are allocated evenly spaced subcarriers.

The xDSL methods of transmission, e.g. ADSL, brought about a plurality of applications for the DMT method. The modulation of the transmittal data on the side of the transmitter is accomplished with an Inverse Discrete Fourier Transform (IDFT) while the transmitted data are demodulated on the receiver side with the assistance of the Discrete Fourier Transform (DFT).

For the sake of simplifying the considerations set forth herein after, the transmission over an entirely dispersion-free channel will be considered first so that the transmitted transmitter signals are not being distorted.

The data stream to be transmitted $A_k = 0,1,2,\ldots$ is combined into blocks of a length M, M designating the number of subchannels. Simultaneously, M is the block length of the IDFT:

$$\begin{array}{lrl} 0^{\text{th}} \text{ block} & \mathbf{A}_0 = & [A_0 \quad A_1 \quad \ldots \quad A_{M-1}]^T \\ 1^{\text{st}} \text{ block} & \mathbf{A}_\mathrm{M} = & [A_M \quad A_{M+1} \quad \ldots \quad A_{2M-1}]^T \\ m. \text{ block} & \mathbf{A}_{\mathrm{mM}} = & [A_{mM} \quad A_{mM+1} \quad \ldots \quad A_{mM+M-1}]^T \end{array}$$

For a real transmitter signal, only M/2 of the data may be selected freely, whereas the remaining M/2 data is conjugate-complex relative to the first mentioned M/2 data (e.g., ADSL with 256 sounds yields M=512)

$$\begin{array}{rll} \mathbf{a}_0 = & [a_0 \quad a_1 \quad \ldots \quad a_{M-1}]^T & = \sqrt{M} \cdot \mathrm{IDFT_M}\{\mathbf{A}_0\} \\ \mathbf{a}_\mathrm{M} = & [a_M \quad a_{M+1} \quad \ldots \quad a_{2M-1}]^T & = \sqrt{M} \cdot \mathrm{IDFT_M}\{\mathbf{A}_\mathrm{M}\} \\ \mathbf{a}_{\mathrm{mM}} = & [a_{mM} \quad a_{mM+1} \quad \ldots \quad a_{mM+M-1}]^T & = \sqrt{M} \cdot \mathrm{IDFT_M}\{\mathbf{A}_{\mathrm{mM}}\} \end{array}$$

The blocks a_{kM}, k=0,1,2,... are serially laid at the output and transmitted.

In Fig. 1, crosstalk of a subchannel 0 on the other subchannels is illustrated for a transmission system with M=16 subchannels. Accordingly, a subchannel is composed of one major lobe and of several side lobes. Superimposition of three of the overall sixteen subcarriers is shown in Fig. 2.